CLAIMS:

1. An optical substrate comprising:

at least one surface, said at least one surface comprising at least one optical structure having a shape and dimensions, wherein the shape and dimensions of each optical structure represents in part a modulation of a corresponding idealized structure, and wherein said shape and dimensions of each of said at least one optical structure is determined in part by at least one randomly generated component of modulation wherein the modulation of each of said at least one optical structure is limited by a neighboring optical structure comprised by the surface.

2. An optical substrate according to claim 1 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (1)

$$y_i = A_i \sin\{\phi\lambda - \Phi_i\} + S_i \qquad (1)$$

defined relative to a segment C of a coordinate system, wherein $i$ is an integer indicative of the $i^{th}$ surface path, $y_i$ is an instantaneous displacement of the path relative to $C$ on the $i^{th}$ path, $A_i$ is an amplitude scaling factor of the $i^{th}$ path relative to $C$, $S_i$ is a shift in a starting position of $y_i$, $\phi$ is a number between zero and $2\pi$ inclusive, $\lambda$ is a wavelength which is a real number, $\Phi_i$ is a phase component for the $i^{th}$ path, wherein

$$\Phi_i = \Phi_{i-1} + Q_i\Delta + R_i\delta \qquad (2)$$

where $Q_i$ is a randomly or pseudo randomly chosen number having a value of 1 or $-1$, $R_i$ is a continuous random variable between $-1$ and 1, each defined for the $i^{th}$ path, and $\Delta$ and $\delta$ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

3. An optical substrate according to claim 1 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (3a)

$$y_i = \sum_{k=1}^{n} A_{i,k} \sin\{\phi\lambda_k - \Phi_{i,k}\} + S_i \qquad (3a)$$

defined relative to a segment C of a coordinate system, wherein $i$ is an integer indicative of the $i^{th}$ surface path, $y_i$ is an instantaneous displacement of the path relative to $C$ on the $i^{th}$ path,

$A_{i,k}$ is the $k^{th}$ amplitude scaling factor of the $i^{th}$ path relative to $C$, $S_i$ is a shift in a starting position of $y_i$, $\phi$ is a number between zero and $2\pi$ inclusive, n is an integer greater than 1, each wavelength $\lambda_k$ is a real number, $\Phi_{i,k}$ is the $k^{th}$ phase component of the $i^{th}$ path, wherein

$$\Phi_{i,k} = \Phi_{i-1,k} + Q_{i,k}\ \Delta + R_{i,k}\delta \qquad (3b)$$

$Q_{i,k}$ is the $k^{th}$ randomly or pseudo randomly chosen number having a value of 1 or $-1$ for the $i^{th}$ path, $R_{i,k}$ is the $k^{th}$ continuous random variable having a value between $-1$ and 1 for the $i^{th}$ path, and $\Delta$ and $\delta$ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

4. An optical substrate according to claim 1 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (4a)

$$y_i = \sum_{k=1}^{n} A_{i,k}\, \mathrm{f}\ \{\phi\lambda_k - \Phi_{i,k}\} + S_i \qquad (4a)$$

wherein $f$ is a periodic function defined relative to a segment C of a coordinate system, wherein $i$ is an integer indicative of the $i^{th}$ surface path, $y_i$ is an instantaneous displacement of the path relative to $C$ on the $i^{th}$ path, $A_{i,k}$ is the $k^{th}$ amplitude scaling factor of the $i^{th}$ path relative to $C$, $S_i$ is a shift in a starting position of $y_i$, $\phi$ is a number between zero and $2\pi$ inclusive, n is an integer greater than 1, each wavelength $\lambda_k$ is a real number, $\Phi_{i,k}$ is the $k^{th}$ phase component of the $i^{th}$ path, wherein

$$\Phi_{i,k} = \Phi_{i-1,k} + Q_{i,k}\ \Delta + R_{i,k}\delta \qquad (4b)$$

$Q_{i,k}$ is the $k^{th}$ randomly or pseudo randomly chosen number having a value of 1 or $-1$ for the $i^{th}$ path, $R_{i,k}$ is the $k^{th}$ continuous random variable having a value between $-1$ and 1 for the $i^{th}$ path, and $\Delta$ and $\delta$ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

5. The substrate of claim 3 where $0 \leq \Delta < (0.95\ \pi)$ radians.

6. The substrate of claim 3 where $0 \leq \delta < (0.5\ \pi)$ radians.

7. The substrate of claim 3 where $0 \leq \Delta < (0.95\ \pi)$ radians and $0 \leq \delta < (0.5\ \pi)$ radians.

8. An optical substrate according to claim 1 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function

$$y_i = A_i[(1-m)\, r_i(\phi) + m\ r_{i-1}(\phi)] + S_i$$

wherein i and i-1 are indicative of an $i^{th}$ and a $(i-1)^{th}$ path, respectively, the $i^{th}$ and the $(i-1)^{th}$ paths being adjacent paths, the $i^{th}$ and the $(i-1)^{th}$ path amplitudes being mixed, wherein part of a random vector for $y_{i-1}$ is added to $y_i$ for the $i^{th}$ path, wherein $r_i(\phi)$ is a band-limited random or pseudo random function of $\phi$ for each $i^{th}$ path, $r_i(\phi)$ has a continuously varying value between $-1$ and 1;

$\phi$ is 0 to $2\pi$ inclusive;

m is a scalar mixing parameter with a value between 0 and 1;

$A_i$ is an amplitude scaling parameter; and

$S_i$ is a shift in a starting position of $y_i$.

9. The optical substrate of claim 1, wherein the optical substrate comprises an optically transparent film having a second surface opposite to the first surface, the second surface being smooth.

10. The optical substrate of claim 2, wherein the optical substrate comprises an optically transparent film having a second surface opposite to the first surface, the second surface being smooth.

11. The optical substrate of claim 3, wherein the optical substrate comprises an optically transparent film having a second surface opposite to the first surface, the second surface being smooth.

12. The optical substrate of claim 4, wherein the function $f$ is selected from the group of mathematical functions consisting of triangular function, sawtooth function and square wave function.

13. A backlight display device comprising:

a light source for generating light;

a light guide for guiding the light therealong including a reflective surface for reflecting the light out of the light guide; and

an optical film comprising:

at least one surface, said at least one surface comprising at least one optical structure having a shape and dimensions, wherein the shape and dimensions of each optical structure represents in part a modulation of a corresponding idealized structure, and wherein said shape and dimensions of each of said at least one optical structure is determined in part by at least one randomly generated component of modulation wherein the modulation of each of said at least one optical structure is limited by a neighboring optical structure comprised by the surface.

14. The backlight display device of in claim 13 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (1)

$$y_i = A_i \sin\{\phi\lambda - \Phi_i\} + S_i \qquad (1)$$

defined relative to a segment C of a coordinate system, wherein $i$ is an integer indicative of the $i^{th}$ surface path, $y_i$ is an instantaneous displacement of the path relative to $C$ on the $i^{th}$ path, $A_i$ is an amplitude scaling factor of the $i^{th}$ path relative to $C$, $S_i$ is a shift in a starting position of $y_i$, $\phi$ is a number between zero and $2\pi$ inclusive, $\lambda$ is a wavelength which is a real number, $\Phi_i$ is a phase component for the $i^{th}$ path, wherein

$$\Phi_i = \Phi_{i-1} + Q_i\Delta + R_i\delta \qquad (2)$$

where $Q_i$ is a randomly or pseudo randomly chosen number having a value of 1 or $-1$ $R_i$ is a continuous random variable between $-1$ and 1, each defined for the $i^{th}$ path, and $\Delta$ and $\delta$ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

15. The backlight display device of claim 13 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (3a)

$$y_i = \sum_{k=1}^{n} A_{i,k} \sin\{\phi\lambda_k - \Phi_{i,k}\} + S_i \qquad (3a)$$

defined relative to a segment C of a coordinate system, wherein $i$ is an integer indicative of the $i^{th}$ surface path, $y_i$ is an instantaneous displacement of the path relative to $C$ on the $i^{th}$ path, $A_{i,k}$ is the $k^{th}$ amplitude scaling factor of the $i^{th}$ path relative to $C$, $S_i$ is a shift in a starting position of $y_i$, $\phi$ is a number between zero and $2\pi$ inclusive, n is an integer greater than 1, each wavelength $\lambda_k$ is a real number, $\Phi_{i,k}$ is the $k^{th}$ phase component of the $i^{th}$ path, wherein

$$\Phi_{i,k} = \Phi_{i-1,k} + Q_{i,k}\ \Delta + R_{i,k}\delta \qquad (3b)$$

$Q_{i,k}$ is the $k^{th}$ randomly or pseudo randomly chosen number having a value of 1 or $-1$ for the $i^{th}$ path, $R_{i,k}$ is the $k^{th}$ continuous random variable having a value between $-1$ and 1 for the $i^{th}$ path, and $\Delta$ and $\delta$ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

16. The backlight display device of claim 13 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function

$$y_i = A_i\left[(1-m)\ r_i(\phi) + m\ \ r_{i-1}(\phi)\right] + S_i$$

wherein i and i-1 are indicative of an $i^{th}$ and a $(i-1)^{th}$ path, respectively, the $i^{th}$ and the $(i-1)^{th}$ paths being adjacent paths, the $i^{th}$ and the $(i-1)^{th}$ path amplitudes being mixed, wherein part of a random vector for $y_{i-1}$ is added to $y_i$ for the $i^{th}$ path, wherein $r_i(\phi)$ is a band-limited random or pseudo random function of $\phi$ for each $i^{th}$ path, $r_i(\phi)$ has a continuously varying value between $-1$ and 1;

$\phi$ is 0 to $2\pi$ inclusive;

m is a scalar mixing parameter with a value between 0 and 1;

$A_i$ is an amplitude scaling parameter; and

$S_i$ is a shift in a starting position of $y_i$.

17. The backlight display device of claim 15 wherein $S_i - S_{i-1}$ is in the range of 5 μm to 200 μm.

18. The backlight display device of claim 15 wherein the prismatic structure has an apex angle of between 20 degrees and 160 degrees.